

THE CLASSIFICATION OF THE ALEYRODIDÆ.

BY T. D. A. COCKERELL.

The American species of this homopterous family have been well treated by Quaintance (*Tech. Bull.*, 8, Div. Ent., Dep. Agric., 1900); in the following essay an attempt is made to classify and catalogue the species of the world.

ALEYRODIDÆ Westwood, 1840.

Adults of both sexes with two pairs of wings, which are rounded apically and appear more or less mealy; the edges of the wings are ornamented with a distinct sculpture or little bunches of bristles. Antennæ simple in form, seven-jointed; first two joints short and stout. Legs six, all well developed. Eyes often constricted in the middle, or even completely divided. Tarsi with two claws. Size always small.

Egg elliptical, with a short peduncle (fig. 9).

Larva oval, with short, stout legs.

Pupa quiescent, oval, often with a waxy fringe. Margin variously sculptured (figs. 4, 5, 6). Abdomen sometimes with large secretory pores (fig. 4). On the dorsal surface of the abdomen is an orifice, known as the vasiform orifice, provided with a more or less rounded flap, the operculum, and a usually elongate narrow two-jointed structure, the lingua (fig. 3).

Adult with the median vein of wings forked; pupa with the lingua large, ALEYRODICUS.
 Adult with the median vein of wings not forked; pupa with the lingua usually small, ALEYRODES.

ALEURODICUS Douglas.

Aleurodicus Douglas, Ent. Mo. Mag., Ser. II, Vol. 3 (1892), p. 32.

All the species belong to the warmer parts of America, except *A. holmesii* from Fiji, which was, I suspect, introduced from America with the *Psidium* on which it feeds. The adults are easily recognized by the venation of the wings (fig. 1), although *Aleyrodes*

often has a fold which simulates a branch. The submedian vein has usually been considered a branch of the median, but it appears to have in every case a separate origin. The pupa of *Aleurodicus* is rather easily recognized by its large lingua, and the nearly universal possession of very large secretory pores along the sides of the abdomen. The margin of the pupa is often provided with hairs at rather distant intervals.

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| 1. <i>cocois</i> (Curtis). | 7. <i>ornatus</i> Ckll., fig. 1. |
| 2. <i>anone</i> Morgan. | 8. <i>pulvinatus</i> (Mask.). |
| 3. <i>dugesii</i> Ckll. | 9. <i>altissimus</i> (Quaint.). |
| 4. <i>iridescens</i> Ckll. | 10. <i>perseæ</i> (Quaint.). |
| 5. <i>mirabilis</i> (Ckll.), figs. 3, 4. | 11. <i>holmesii</i> (Mask.). |
| 6. <i>minimus</i> Quaint. | 12. <i>jamaicensis</i> n. sp., fig. 2. |

Aleurodicus jamaicensis was collected by the writer at Kingston, Jamaica, in 1893. The pupa is small (hardly $1\frac{1}{2}$ mm. long), with vertical walls, margin resembling that of *pulvinatus*; color bright yellow, with a brownish dorsal cloud, and a diamond-shaped black patch just anterior to the vasiform orifice. Other characters are shown in fig. 2.

Subg. **DIALEURODICUS** n. subg.

Pupa without any profuse secretion or wax rods; no large secretory pores; adult with short spotted wings, the branch of the median vein more basal than usual. Type *Aleurodicus cockerelli* Quaintance, from Brazil.

ALEYRODES Latreille.

Aleyrodes Latreille, Hist. Nat. Crustacés et Insectes, Vol. XII (1804), p. 347.

Type *A. prolella* (L.).

The species average smaller than *Aleurodicus* and the median vein is not forked. The pupæ often have a lateral fringe of waxy rods or ribbons. As at present understood, the genus is cosmopolitan.

(1) PALEARCTIC SPECIES.

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| 1. <i>aceris</i> (Baer.). | 5. <i>carpini</i> Koch. |
| 2. <i>avellana</i> Sign. | 6. <i>dubia</i> Hegeer. |
| 3. <i>brassicæ</i> Walk. | 7. <i>fragariæ</i> Sign. |
| 4. <i>capræ</i> Sign. | 8. <i>fraxini</i> Sign. |

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| 9. <i>immaculata</i> Hegeer. | 16. <i>ribium</i> Dougl. |
| 10. <i>jelinekii</i> Frauentf. | 17. <i>rubi</i> Sign. |
| 11. <i>lonicera</i> Walk. | 18. <i>rubicola</i> Dougl. |
| 12. <i>phillyrea</i> Halid. | 19. <i>spiraea</i> Dougl. |
| 13. <i>prenanthis</i> (Schr.). | 20. <i>vaccinii</i> Künow. |
| 14. <i>proletella</i> (L.). | 21. <i>xylostei</i> Westhoff. |
| 15. <i>quercus</i> Sign. | 22. <i>lauri</i> Sign. |

(2) ETHIOPIAN SPECIES.

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| 23. <i>asparagi</i> Lewis. (Natal.) | 24. <i>bergii</i> Sign. (Mauritius.) |
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(3) ORIENTAL SPECIES.

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| 25. <i>nubilans</i> Buckton. | 30. <i>piperis</i> Mask. |
| 26. <i>barodensis</i> Mask. | 31. <i>gossypii</i> (Fitch). |
| 27. <i>cotesii</i> Mask. | 32. <i>lactea</i> Zehnt. (Java.) |
| 28. <i>engenic</i> Mask. | 33. <i>longicornis</i> Zehnt. (Java.) |
| 29. <i>aurantii</i> (Mask.). | |

(4) AUSTRALASIAN SPECIES.

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| 34. <i>sacchari</i> Mask. F. | 42. <i>comata</i> Mask. F. |
| 35. <i>lecanioides</i> (Mask.). N.
Syn. <i>papillifer</i> Mask. | 43. <i>croceata</i> Mask. A. |
| 36. <i>asplenii</i> Mask. N. | 44. <i>decipiens</i> Mask. A. |
| 37. <i>aurea</i> (Mask.). N.
Syn. <i>melieyti</i> Mask. | 45. <i>fodiens</i> Mask. N. |
| 38. <i>fagi</i> Mask. N. | 46. <i>hirsuta</i> Mask. A. |
| 39. <i>simplex</i> Mask. N. | 47. <i>limbata</i> Mask. A. |
| 40. <i>banksiae</i> Mask. A. | 48. <i>nigra</i> Mask. A. |
| 41. <i>cerata</i> Mask. N. | 49. <i>stypheleae</i> Mask. A. |
| | 50. <i>T-signata</i> Mask. A. |

Those marked A. are from Australia; N., from New Zealand, and F., from Fiji.

(5) NEOTROPICAL SPECIES.

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| 51. <i>phalacroides</i> Blanch. | 55. <i>cockerelli</i> Von Ihr. B. |
| 52. <i>tinacoides</i> Blanch. | 56. <i>floccosa</i> Mask. J. |
| 53. <i>aëpim</i> Goeldi. B. | 57. <i>fumipennis</i> Hempel. B. |
| 54. <i>filieum</i> Goeldi. B. | 58. <i>goyabae</i> Goeldi. B. |

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| 59. <i>horrida</i> Hempel. B. | 64. <i>vinsonioides</i> Ckll. M. Fig. |
| 60. <i>parva</i> Hempel. B. | 6. |
| 61. <i>stellata</i> Mask. J. | 65. <i>lacerda</i> Sign. |
| 62. <i>tracheifer</i> Quaint. M. | 66. <i>youngi</i> Hempel. B. |
| 63. <i>vaporariorum</i> Westw. | 67. <i>struthanthi</i> Hempel. B. |

A. vaporariorum occurs in hothouses in Europe and the United States, but is supposed to have originated in Brazil. In the above list, B. = Brazil, M. = Mexico, J. = Jamaica.

(6) NEARCTIC SPECIES.

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| 68. <i>abnormis</i> Quaint. | 83. <i>gelatinosa</i> Ckll. Figs. 5, 9. |
| 69. <i>abutilonea</i> Hald. | 84. <i>graminicola</i> Quaint. |
| 70. <i>acacia</i> Quaint. | 85. <i>inconspicua</i> Quaint. |
| 71. <i>asarumis</i> Shimer. | 86. <i>mori</i> Quaint. |
| 72. <i>aureocincta</i> Ckll. | 87. <i>mori arizonensis</i> Ckll. |
| 73. <i>berbericola</i> Ckll. Fig. 8. | 88. <i>nephrolepidis</i> Quaint. |
| 74. <i>citri</i> R. and H. (prob. introd. from China). | 89. <i>nicotianæ</i> Mask. |
| 75. <i>corni</i> Hald. | 90. <i>pergandei</i> Quaint. |
| 76. <i>coronata</i> Quaint. | 91. <i>plumosa</i> Quaint. |
| 77. <i>perileuca</i> Ckll. | 92. <i>pyrolæ</i> G. and B. |
| 78. <i>melanops</i> Ckll. | 93. <i>quercus-aquaticæ</i> Quaint. |
| 79. <i>erigerontis</i> Mask. | 94. <i>rolfsii</i> Quaint. |
| 80. <i>fitchi</i> Quaint. | 95. <i>ruborum</i> Ckll. |
| 81. <i>floridensis</i> Quaint. | 96. <i>spiræoides</i> Quaint. |
| 82. <i>forbesii</i> Ashm. | 97. <i>variabilis</i> Quaint. Fig. 7. |
| Syn. <i>aceris</i> Forbes. | 98. <i>vittata</i> Quaint. |

A. mori arizonensis is the form on *Citrus* in Arizona, described in *Science Gossip*, 1900, p. 366.

Subg. **ASTEROCHITON** Maskell.

Asterochiton Maskell, Trans. New Zealand Inst. for 1878, Vol. XI, p. 214.

Type *A. aurea*. Adult with second joint of antennæ much longer than first; pupa broad, with four radiating bands of circular markings; vasiform orifice elongate. *A. lecanioides*, described also under *Asterochiton*, does not belong to the subgenus as here defined.

Subg. **DIALEURODES** n. subg.

Type *A. citri*; also includes *A. eugenie* and *A. aurantii*. Adult with second joint of antennæ much longer than first; eyes not completely divided; male abdomen with a large ventral waxy tuft on emerging from pupa. Pupa not fringed; vasiform orifice broad, lingua short; three radiating grooves, one posterior and two antero-lateral, terminating peripherally in a star-shaped opening.

Subg. **TRIALEURODES** n. subg.

Type *A. pergandei*. This name is proposed for an American series (including *pergandei*, *variabilis*, *fitchi*, *ruborum*, *vittata*, *erigerontis*, etc.) in which the apical segment of the lingua is strongly crenulated. The posterior end of the vasiform orifice is often bifid.

Subg. **TETRALEURODES** n. subg.

Type *A. perileuca*. Pupa extremely dense, black, with a fringe of radiating waxy ribbons. Vasiform orifice shovel-shaped. Margin of pupa very regularly and strongly beaded; dorsum keeled. Includes also *A. melanops*. Occurs on the upper side of leaves of *Quercus*. Southern California and Texas.

EXPLANATION OF PLATE XV.

Fig. 1.—*Aleurodicus ornatus* (imago).—A. Venation of upper wing. B. Claw. C. Margin of wing.

Fig. 2.—*Aleurodicus jamaicensis*.—A. Vasiform orifice, etc. B. margin of pupa. C. Side view of pupa. D. Abdominal pore.

Fig. 3.—*Aleurodicus mirabilis*.—Diagram of vasiform orifice, etc.

Fig. 4.—*Aleurodicus mirabilis*.—A. Pupa, showing involuted margin. B. Edge of pupa (involuted). C. Abdominal pore.

Fig. 5.—*Aleyrodes gelatinosa*.—Margin of pupa.

Fig. 6.—*Aleyrodes vinsonioides*.—Margin of pupa.

Fig. 7.—*Aleyrodes variabilis*.—Vasiform orifice, etc.

Fig. 8.—*Aleyrodes berbericola*.—A. Margin of pupa. B. Margin of wing.

Fig. 9.—*Aleyrodes gelatinosa*.—Egg from body of female.